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ABSTRACT

This study examined the performance of 48 students (mean age 10 years, 6 months) referred for evaluation of learning disabilities with the Wechsler Individual Achievement Test (WIAT) and the Woodcock-Johnson Psychoeducational Battery-Revised Tests of Achievement (WJ-R). The student sample consisted of 33 males and 15 females, all attended schools in a midwest, rural school system. The WIAT and WJ-R were administered in counterbalanced order. Mean scores on the WIAT composites ranged from 80.32 (writing composite) to 99.24 (language composite) and on the WJ-R clusters from 83.64 (basic writing skills) to 96.93 (mathematics reasoning). Pearson product moment correlations were significant for the WIAT reading construct (with the WJ-R scores of broad reading, basic reading skills, and reading comprehension) and for the WIAT mathematics composite (with the WJ-R scores of broad mathematics and mathematics reasoning). WIAT scores were significantly lower than WJ-R scores. Implications of specific differences in subtests between the two test batteries for use with students having learning disabilities are discussed. (DB)

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Relationship of the WIAT and WJ-R Tests of Achievement in a Sample of Students Referred for Learning Disabilities

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ABSTRACT

Relationship of the WIAT and WJ-R Tests of Achievement in a Sample of Students Referred for Learning Disabilities

The Wechsler Individual Achievement Test (WIAT) is an individually administered battery of achievement tests for students in grades K through 12. While numerous validity studies were included in the WIAT Manual, most of them involved regular education students. Therefore, the purpose of the present study was to examine the performance of students referred for evaluation of learning disabilities on the WIAT and the WJ-R Tests of Achievement. The sample consisted of 48 students (33 males and 15 females) referred for evaluation of learning disabilities and having a mean age of 10 years, 6 months. The students attended schools in a midwest, rural school system. The WIAT and WJ-R were administered in counterbalanced order. Mean scores on the WIAT composites ranged from 80.32 (Writing Composite) to 99.24 (Language Composite) and on the WJ-R clusters scores ranged from 83.64 (Basic Writing Skills) to 96.93 (Mathematics Reasoning). Pearson product moment correlations were significant ($p < .01$) for the reading construct (WIAT Reading Composite with Broad Reading, Basic Reading Skills, and Reading Comprehension) and for the WIAT Mathematics Composite with Broad Mathematics and Mathematics Reasoning. Other correlations such as WIAT Math Composite with Basic Mathematics Skills and WIAT Writing Composite with Basic Writing Skills were not significant. WIAT scores were significantly lower than WJR scores. Implications of these results for the use of the WIAT and WJR are discussed.

The Wechsler Individual Achievement Test (WIAT) is an individually administered battery of achievement tests for students in grades K through 12. Subtests include Basic Reading (BR), Mathematics Reasoning (MR), Spelling (Sp), Reading Comprehension (RC), Numerical Operations (NO), Listening Comprehension (LC), Oral Expression (OE), and Written Expression (WE; grades 3-12 only). In addition to subtest scores, composite scores are produced in the areas of Reading, Mathematics, Language, and Writing.

In establishing validity for the WIAT, a number of validity studies were conducted in which the performance of groups of students on the WIAT and other achievement measures were compared. Criterion tests included the Basic Achievement Skills Individual Screener (BASIS), Kaufman Test of Educational Achievement (KTEA), Wide Range Achievement Test-Revised (WRAT-R), Differential Ability Scales Achievement Tests and Woodcock-Johnson Psychoeducational Battery-Revised Tests of Achievement (WJRTA). Sample sizes ranged from 28 to 251 and consisted primarily of students without disabilities.

The WJRTA provides a number of cluster scores in the achievement area. For this study the following clusters were utilized: Broad Reading (BR), Basic Reading Skills (BRS), Reading Comprehension (RC), Broad Mathematics (BM), Basic Mathematics Skills (BMS), Mathematics Reasoning (MR), Broad Written Language (BWL), and Basic Writing Skills (BWS). Subtests administered in this study and the clusters on which they are placed included: Reading Vocabulary (RC cluster); Passage Comprehension (BR and RC clusters); Spelling (BWL cluster); Writing Samples (BWL cluster); Applied Problems (BM and BMS clusters); Calculation (BM and BMS clusters); and Quantitative Concepts (BMS cluster).

Purpose of the Study

Since the majority of school psychologists' assessment time is spent with students with learning disabilities (Smith, Clifford, Hesley, & Leifgren, 1992), it is important to determine how the WIAT relates to other achievement tests with this sample of the school population. Therefore, the purpose of the present study was to examine the performance of students referred for evaluation of learning disabilities on the WIAT and the WJRTA.

Method

The sample consisted of 48 students (33 males and 15 females) referred for evaluation of learning disabilities and ranging in age from 6 years, 8 months to 17 years, 7 months (mean age of 10 years, 6 months). The students attended schools in a midwest, rural school system. The WIAT and WJRTA were administered in counterbalanced order by the school psychologist and learning disabilities resource teacher, respectively. Time between test administrations ranged from 1 day to 89 days with a mean of 15 days.

Results and Discussion

Mean scores on the WIAT composites ranged from 80.32 (Writing Composite) to 99.24 (Language Composite) while cluster scores on the WJRTA ranged from 83.64 (Basic Writing Skills) to 96.93 (Mathematics Reasoning). Mean subtest scores on the WIAT ranged from 82.17 (Spelling) to 99.35 (Oral Expression), while mean subtest scores on the WJRTA ranged from 82.89 (Quantitative Concepts) to 96.96 (Applied Problems). The majority of mean scores on both instruments were below 90 which is not unexpected since all students were receiving services for learning disabilities. The complete results are presented in Tables 1 and 2.

Insert Tables 1 & 2 about here

In order to examine how the two tests related to each other, Pearson product moment correlations were calculated for the two tests with each other. The most meaningful comparisons are among those scales purportedly measuring similar constructs including reading, mathematics, and written language skills. Specifically, these involve Reading Composite (RComp) with BR (.70, $p < .001$); RComp with BRS (.81, $p < .001$); RComp with RC (.81, $p < .005$); Mathematics Composite (MComp) with BM (.54, $p < .001$); MComp with BMS (.14, NS); MComp with MR (.43, $p < .01$); Language Composite (LComp) with BWL (-.39, NS); and Writing Composite (WComp) with BWL (.59, $p < .06$); and WComp with BWS (.12, NS).

Differences in mean global scale scores for similar constructs were analyzed by t-tests for related samples. Significant results were obtained for the reading construct with RComp < BR ($t = 3.36$, $p < .01$); RComp < BRS ($t = 2.85$, $p < .01$); RComp < RC ($t = 2.85$, $p < .01$). In each comparison the WIAT scores were significantly lower than the WJRTA scores by three to six points. Similar results were obtained for the mathematics construct with MComp < MR ($t = 4.61$, $p < .001$), MComp > BMS ($t = 1.96$, NS); and MComp < BM ($t = 2.14$, $p < .04$). In two of the three comparisons the WIAT scores were lower than the WJRTA scores with a significant difference in two of the three comparisons. In the written language area, the mean scores on the WComp were significantly higher than the BWL cluster score ($t = 3.99$, $p < .01$). No significant difference was indicated for the WComp and BWS cluster score comparison ($t = 2.27$, NS).

To further analyze the relationships between the two tests, Pearson product moment correlations were calculated for the subtests purportedly measuring similar constructs. In the reading/language area these comparisons included: Basic Reading with Reading Vocabulary ($r = .54$, $p < .05$); Reading Comprehension with Passage Comprehension ($r = .06$, NS); Spelling with Spelling ($r = .51$, $p < .01$); and Written Expression with Writing Samples ($r = .57$, NS). In the arithmetic area, these comparisons included: Mathematics Reasoning with Applied Problems ($r = .63$, $p < .001$); Numerical Operations with Calculation ($r = .57$, $p < .001$); Numerical Operations with Quantitative Concepts ($r = .00$, NS); and Math Reasoning with Quantitative Concepts ($r = -.08$, NS).

These results suggest that the WIAT and WJRTA measure reading skills in similar ways as evidenced by the strong correlations between the global reading scales of the two tests. The global scales of both instruments relate highly to each other as shown by the significant and strong correlations (.70 to .81). Among the individual subtests, however, some variability exists.

In the reading/language area the subtests measuring reading recognition skills (Basic Reading and Reading Vocabulary) relate moderately and significantly with each other as do the two spelling subtests. In the area of reading comprehension, the two subtests (Reading Comprehension and Passage Comprehension) are essentially unrelated ($r = .06$). This finding may be a result of the differing approaches to measuring reading comprehension taken by the two tests. On the WIAT Reading Comprehension subtest, students read to themselves (or aloud) a passage which may be accompanied by a picture. The examiner then asks the student a question about the passage. The student is allowed to continue looking at the passage to find the answer. Behavioral

observations suggest that some students, even if they cannot read all of the words in the passage, utilize key words in the questions that are asked to make "educated guesses" that are often correct. For example, on item 12 one student was unable to read any of the words in the passage other than basic sight words ("a," "the") and the words "new car." When asked, "Why did Mr. Clark want a second job?" the student responded correctly: "to get a new car." Other students successfully utilize the picture clues in order to answer the questions correctly. On the Passage Comprehension subtest of the WJRTA, the student is asked to match words with pictures in early items and to read a short passage and identify a missing key word. This modified cloze procedure requires the student to exercise a variety of comprehension and vocabulary skills. Thus, it appears that for students with learning disabilities, the two subtests measure reading comprehension in different ways resulting in scores that may vary greatly from test to test. The correlational data indicate that a statistically significant relationship between the two subtests is not present.

In the spelling area, there are also differences in the way in which the skills are measured. Although a moderate relationship exists between the two subtests, there are important differences as well. The WIAT uses homonyms that depend upon the student knowing the definition of the word in order to spell it correctly. For example, students are asked to spell "right" rather than "write" for item 20; "eight" rather than "ate" for item 22; "sum" rather than "some" for item 25; "weak" rather than "week" for item 27; "knight" rather than "night" for item 29; "sole" rather than "soul" for item 35; "patients" rather than "patience" for item 40; "assistants" rather than "assistance" for item 42; and "prophet" rather than "profit" for item 44.

There are approximately 11 homonyms out of the 50 spelling words. Procedurally, the examiner pronounces the word, uses it in a sentence and then repeats the word. The student must rely upon his or her knowledge of word meanings in order to spell the correct word. For some sets of homonyms the stimulus word is the less common word or the more difficult word to spell. Our observations indicate that if students are impulsive, they often begin writing the word before the examiner has finished reading the sentence. Some students recognize and correct their errors while others become frustrated and give up. For our sample of students with learning disabilities this subtest was problematic. On the WJR, the spelling subtest is administered as part of Written Language within the subtests of Dictation and Proofing. Items include spelling contractions such as "I will," spelling abbreviations such as for "et cetera," as well as more traditional items. Only two sets of homonyms are used in the 56 items.

The correlation between the measures of written language skills is moderate but not statistically significant due to the small sample size completing both subtests (n = 11). There are, however, distinct differences in how written language skills are measured. On the WJRTA students are asked to complete fill in the blank questions, to complete incomplete sentences, and to tell what is happening in various pictures that are presented. For example, on item 3, the student is shown a picture of a cat and is asked to fill in the blank in this statement: "This is a _____." On item 6, the student is shwon a picture of a bird in a cage with musical notes coming from its mouth. The student is asked to "write a good sentence that tells what the bird is doing." The WJRTA provides rather specific instructions as shown by item 13. The student is shown a picture of two children and a ball in what

looks like a game of catch. The student is asked to write a good sentence that tells about the picture and uses the word "and." The WIAT provides the child with a writing prompt, such as writing a letter, and the child must use his or her creativity to a greater extent. The WIAT procedure is less structured than the WJRTA procedure and this may affect the performance of individual students.

In the area of mathematics, there is a strong relationship between the WIAT Mathematics Composite and the WJRTA Broad Mathematics cluster and Mathematics Reasoning Cluster but not with the Basic Mathematics cluster. The Numerical Operations subtest of the WIAT correlated equally well with Applied Problems ($r = .63$) and with Calculation ($r = .57$). Thus, the Numerical Operations subtest appears to incorporate into one subtest those skills measured by the two WJRTA subtests. The Quantitative Concepts subtest of the WJRTA did not correlate significantly with any of the WIAT mathematics subtests. Thus, the Quantitative Concepts subtest seems to add a unique feature to the measurement of mathematics skills.

Summary and Conclusions

The global scales of the WIAT and WJRTA related strongly to each other in this sample of 48 students with learning disabilities. Mean WIAT composite scores were three to six points lower than mean scores on the WJRTA clusters. Subtest comparisons indicated some differences in how skills are measured. Reading comprehension, especially, is measured in different ways by the two instruments and scores on the Reading Comprehension and Passage Comprehensions subtests are essentially unrelated. The spelling subtests, although moderately and significantly correlated, measure spelling differently with the WIAT utilizing a large number of homonyms which require the student to know

the definition of the word to be spelled in order to spell the correct word. Word recognition skills are measured similarly by both tests and moderate correlations are evident between the Basic Reading and Reading Vocabulary subtests. The Quantitative Concepts subtest of the WJRTA does not have a counterpart on the WIAT and the Language Composite of the WIAT is a unique feature of the WIAT. Both instruments are solid measures of achievement. The differences in measurement approaches should be considered by examiners in selecting the most appropriate test for an individual student.

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Table 1

Composite and Cluster Scores on the WIAT and WJRTA

WIAT	N	MEAN	Standard Deviation	Range
Reading Composite	45	83.38	10.31	61-118
Mathematics Composite	44	89.32	10.60	55-108
Language Composite	21	99.24	11.84	78-123
Writing Composite	22	80.32	9.13	66-107
WJRTA				
Broad Reading	48	87.67	11.80	59-122
Basic Reading Skills	24	87.83	11.93	70-128
Reading Comprehension	17	93.00	8.60	80-115
Broad Mathematics	47	92.09	11.62	54-124
Basic Mathematics Skills	19	86.11	15.06	40-109
Mathematics Reasoning	46	96.93	11.02	71-126
Broad Written Language	26	83.88	8.24	62-97
Basic Writing Skills	14	83.64	9.04	68-98

Table 2

Subtest Scores on the WIAT and WJRTA

WIAT	N	MEAN	Standard Deviation	Range
Basic Reading	48	83.27	10.13	56-116
Mathematics Reasoning	47	90.51	9.38	62-107
Spelling	48	82.17	9.51	55-108
Reading Comprehension	43	86.05	9.92	69-115
Numerical Operations	45	90.11	11.29	58-109
Listening Comprehension	26	98.54	10.75	78-123
Oral Expression	20	99.35	12.93	73-123
Written Expression	21	87.00	8.54	71-103
WJRTA				
Reading Vocabulary	17	91.06	12.30	63-118
Passage Comprehension	48	91.00	12.68	57-122
Spelling	32	84.00	14.74	64-150
Writing Samples	27	87.85	12.80	56-120
Applied Problems	48	96.96	11.74	69-126
Calculation	48	89.50	14.98	52-118
Quantitative Concepts	18	82.89	16.61	34-99